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PALEOPATOLOGIA

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MALIGNANT TUMOURS IN THE ARAGONESE SERIES OF SAINT DOMENICO MAGGIORE OF NAPLES (15th-16th CENTURIES)

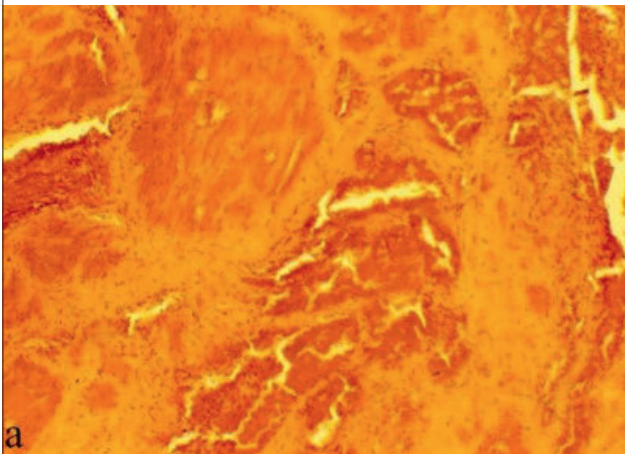
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Cancer nowadays represents the second cause of death in advanced countries. However, there are only five cases of malignant soft tissue tumours in the paleopathological literature¹. The rarity of cancer in Antiquity is a highly debated problem and the main reasons are apparently the short life span of past populations, the scarcity of mummified remains and the technical difficulties for detecting neoplastic lesions in mummified tissues (Zimmerman, 2010).

Three ancient malignant tumours were identified in the Renaissance mummies of the Aragonese court (15th-16th centuries), that are preserved in the Basilica of Saint Domenico Maggiore in Naples. The autopsy performed on the natural mummy of Ferrante I of Aragon (1424-1494), revealed a well-preserved rectum. Histology showed crowded epithelial tumour cells, disposed in cords and glands, typical of a moderately differentiated mucinous adenocarcinoma (Fig. a).

Figure a: Colorectal adenocarcinoma of King Ferrante I of Aragon (1424-1494) infiltrating fibrous stroma (Hematoxylin Eosin, magnification 100X).



Strong immunoreactivity for pan-cytokeratin was shown and DNA analysis of K-RAS exons 1-2 demonstrated the presence of a mutation characteristic of sporadic colorectal cancer and associated with exposure to natural carcinogens present in the diet (Ottini et al., 2011). The histological study of the natural mummy of Prince Luigi Carafa (1511-1576) revealed an extraordinarily well-preserved colon mucosa with an evident villous adenoma and strong immunopositivity for keratins and p53 (Fornaciari, 2017). In some points, clear invasion of the polyp stalk or of the submucosa was evident (Fig. b, arrow): this histological picture is that of a well differentiated adenocarcinoma at stage T1 (Fornaciari, 2017).

The natural mummy of Duke Ferdinando Orsini (ca 1490-1549),

Figure b: Colon adenocarcinoma of Luigi Carafa Prince of Stigliano (1511-1576), with invasion of the polyp stalk (arrow) (Anti-Pan Keratin Ventana®, 250X).

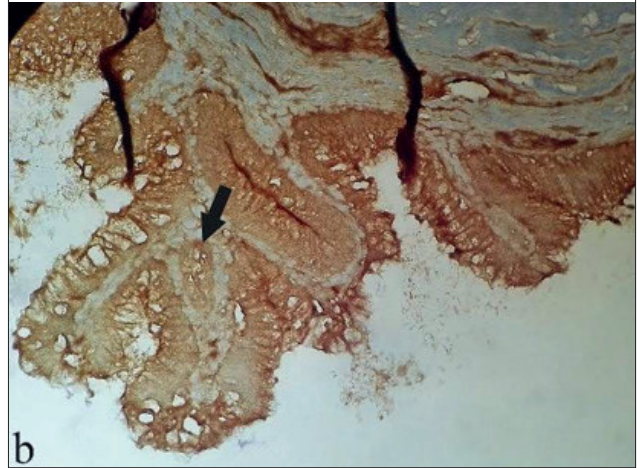
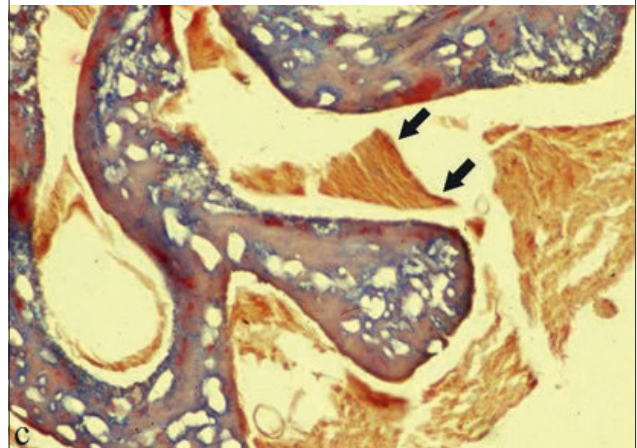


Figure c: Typical basal cell carcinoma (arrows) of Ferdinando Orsini duke of Gravina (ca 1490-1549), with solid tumour destroying the lamellar bone (Van Gieson, 120X).



showed a wide destructive lesion of the right orbit and nose. Bone histology revealed large lacunae destroying the normal lamellar bone, containing clusters of cells with solid epithelial-like aspects and a darker margin “at palisade” (Fig. c, arrow), with strong positivity for pan-cytokeratin, typical of a destructive basal cell carcinoma (Gaeta et al., 2017a).

The small series of mummies from Naples, composed of eleven adults (10 males and 1 female) with well three cases of cancer in individuals between 55 and 71 years of age, is very important. Despite the limited number of specimens, the cancer prevalence of 27.0% that was found is similar to the 30.9% rate in modern countries (Torre et al., 2012). We can hypothesize that cancer must have been frequent after 50-60 years of age, at least in the Renaissance elite classes with peculiar alimentary and life style habits, as in this series of Spanish nobles (Gaeta et al., 2017b).

In conclusion, the statements according to which cancer was an extremely rare event in the past populations should be revised. Future accurate autoptic studies of mummies will be essential not only to diagnose new paleopathological cases, but also to clarify the mechanisms of ancient neoplastic progression.

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DISEASE, DEATH AND BODY EMBALMING OF SAN GIACOMO DELLA MARCA

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Introduction

Domenico Gangàla was born on september 1393 in Montepandone (Marche region, central Italy). Under the guidance of an uncle priest, he studied in the nearby cities of Offida and Ascoli. Once graduated in both laws at the University of Perugia, he joined the Franciscan Order of Minor Friars with the name of Giacomo and was ordered priest in 1420. Along with Giovanni da Capestrano and Bernardino da Siena, he represented a leading figure of the reformation movement called Minoritic Observance. Since 1427, he received diplomatic and inquisitional commissions by the Pope in Italy and Eastern Europe. His actions were particularly addressed against the heretic sect of the "Fratricelli" and the Jews. In anti-judaic function, he also established numerous Mounts of Piety to lend money at a low interest to the poor.

At the age of 80 he was requested by the Aragonese King in Naples, where he remained until his death, occurred on november 28, 1476. His body, housed in the church of Santa Maria la Nova, was relocated in the Sanctuary of Santa Maria delle Grazie in Montepandone in 2001 (Figures 1 and 2). During the fifth Canon Recognition, the body was investigated in order to evaluate its preservation status in the new location. Secondary historical sources have been studied to highlight significant data in order to identify pathologic conditions, cause of death and mummification process.

Methods

The recognition was carried out in 2008 by visual inspection of the body, followed by computed tomography (CT) examination and conservative sampling of significant materials for

laboratory investigations. The mummy underwent total body CT scanning using a multislice General Electric LightSpeed Pro 32 scanner with 0.625 mm thick sections at 500 mA and 120 kV. Tomodensitometric evaluations were also made according to the Hounsfield scale and 3D reconstructions were carried out. In order to establish the presence and chemical composition of skin surface materials, tiny samples were studied using binocular stereomicroscopy (BSM) and scanning electron microscopy (SEM), also with energy dispersive X-ray analysis (EDX). Further investigations are planned to identify organic compounds and pollen grains.

Results

The body was in a good state of preservation, measured 160 cm in length and belonged to an elderly subject showing artificial remodelling of the face (Fig. 2). After removing

Figure 2.



Figure 3.



Figure 1.



the modern garments covering the body, external inspection revealed a 26 cm long xipho-pubic incision sutured with stitches in a brown thread (Fig. 3), performed to eviscerate the abdomen and the thorax via the diaphragm, as confirmed by the packing materials (folded fabrics) noted on CT scanning. A large defect of perineal skin suggested a possible incision for pelvic evisceration, whereas cutaneous folds were present in the abdomen and the lower limbs. A posterior craniotomy appeared well evident, in form of a circular sutured incision of 10 cm in largest diameter (Fig. 4).

Excerebration was confirmed at CT level by bone defect and intracranial packings. No defleshing incisions were noted in the limbs. CT examination also displayed edentulism, moderate osteoarthritis of the spine, hips and knees, and a lesion in the head of the first metatarsal bone of the left foot, suggestive of gout. Hypertrophic muscular insertions of ileopsoas, vas-